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EXAMINER	
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2167	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/800,109	MERCIER ET AL.	
	Examiner	Art Unit	
	Luke S. Wassum	2167	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *18 December 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *23-54* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23-54* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 March 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. The Applicants' amendment, filed 18 December 2008, has been received, entered into the record, and considered.

2. As a result of the amendment, claims 23, 25, 30, 31, 33-36, 39, 40 and 46-49 have been amended, and new claims 50-54 have been added. Claims 1-22 have been previously canceled. Claims 23-54 are now pending in the application.

Priority

3. The examiner acknowledges the Applicants' claim to domestic priority under 35 U.S.C. § 120, as a continuation of application 09/375,819, filed 16 August 1999.

Claim Objections

4. In view of the Applicants' amendment to claims 47 and 48, the pending claim objections are withdrawn.

5. Claims 31-38, 46, 48, 53 and 54 are objected to because of the following informalities:

Regarding claim 31, there is an extraneous 'being' in the 'determining, in response to the write request…' limitation ('…range of data bytes *being* of the source being copied;').

Regarding claim 46, in the second line of the 'receiving' step, 'the copy operating' should be 'the copy *operation'*.

Dependent claims 32-38, 48 and 54, fully incorporating the deficiencies of parent claim 31, are likewise objected to.

Appropriate correction is required.

6. Regarding claim 53, the term 'out-band' should be 'out-of-band'.

7. Claim 54 is additionally objected to because there is a typographical error. In the first limitation, the determination must be that the write request range falls within the range of data bytes of the source being copied.

Claim Rejections - 35 USC § 112

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 49 and 51 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

10. Claim 49 recites the limitation "the snapshot". There is insufficient antecedent basis for these limitations in the claim.

11. Regarding claim 51, this claim attempts to include both a system and a method. For instance, the last limitation includes only a method step. Such a claim makes it unclear whether infringement would occur when one creates a system designed to make a copy of a database, or performs the claimed steps to make the copy of a database. See *IPXL Holdings, LLC v. Amazon.com, Inc.*, CAFC 05-1009, -1487, (Fed. Cir. 2005).

Claim Rejections - 35 USC § 101

12. In view of the amendment to claim 49, the pending claim rejection under 35 U.S.C. § 101 is withdrawn.

Claim Rejections - 35 USC § 102

13. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

14. Claims 23, 26, 28, 29, 31, 34, 36, 37, 39-41, 45, 46, 50-52 and 54 are rejected under 35 U.S.C. 102(b) as being anticipated by **Ofek et al.** (U.S. Patent Application Publication 2005/0204108).

15. Regarding claim 23, **Ofek et al.** teaches a storage system as claimed, comprising:

a) a destination to store a copy from a source (see disclosure of a target destination, such as a receiving primary storage element or receiving secondary storage element such as a tape, paragraph [0248]);

b) a first process to initiate a copy operation of the source, wherein the copy operation includes copying each block of the source to the destination, the copy operation being performed in segments, and each segment being a range of data bytes of the source (see disclosure of the marking of physical

backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

c) the storage system to receive a write request to modify a requested range of data bytes of the source while the copy operation is in progress, wherein the write request to modify the requested range of data bytes is a write request range (see disclosure of the receipt of a request to write [hit] to the source device, paragraph [0247]);

d) the storage system to determine if the write request range falls within the range of data bytes of the source being copied (see disclosure of the determination that the request was for a physical backup segment that is included in the backup segment set in the abstract block set, paragraph [0247]);

e) in response to determining that the write request range falls within the range of data bytes of the source being copied, the storage system to determine if the range of data bytes of the source has been written to a snapshot (see disclosure that the segments yet to be copied will remain marked, paragraph [0247]);

f) in response to determining that the range of data bytes of the source has been written to the snapshot, the write request to be written to the source (see

disclosure that once the requested segment has been copied, the segment is unmarked and the requested update is made, paragraphs [0247] and [0251]); and

g) in response to determining that the range of data bytes of the source have not been written to the snapshot, a second process first to copy the range of data bytes of the source to the snapshot, and then the second process to write the write request to the source (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]).

16. Regarding claim 31, **Ofek et al.** teaches a method as claimed, comprising:

a) starting a copy command from a source to a destination wherein the copy command copies each block of the source to the destination, the copy command being performed in segments and each segment specifying a range of data bytes of the source (see disclosure of the marking of physical

backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

b) receiving a write request to modify a requested range of data bytes of the source while the copy command is in progress, wherein the write request to modify the requested range of data bytes is a write request range (see disclosure of the receipt of a request to write [hit] to the source device, paragraph [0247]);

c) determining if the write request range falls within the range of data bytes being of the source being copied (see disclosure of the determination that the request was for a physical backup segment that is included in the backup segment set in the abstract block set, paragraph [0247]);

d) determining, in response to the write request range being in the range of data bytes of the source being copied, if the range of data bytes of the source has been written to a snapshot (see disclosure that the segments yet to be copied will remain marked, paragraph [0247]);

e) writing, in response to the range of data bytes of the source having been written to the snapshot, the write request to the source (see disclosure that once the requested segment has been copied, the segment is unmarked and the requested update is made, paragraphs [0247] and [0251]); and

f) copying, in response to the range of data bytes of the source having not been written to the snapshot, the range of data bytes to the snapshot, and then writing the write request to the source (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]).

17. Regarding claim 39, **Ofek et al.** teaches a computer-implemented method as claimed, comprising:

a) starting a copy operation by copying data from a source to a destination, the copy operation being performed in segments, and each segment having a range of data bytes of the source (see disclosure of the marking of physical backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

b) receiving a write request to modify a requested range of data bytes of the source while the copy operation is in progress, wherein the write request to modify the requested range of data bytes is a write request range (see

disclosure of the receipt of a request to write [hit] to the source device, paragraph [0247]);

c) determining if the write request range falls within the range of data bytes of the source being copied (see disclosure of the determination that the request was for a physical backup segment that is included in the backup segment set in the abstract block set, paragraph [0247]);

d) determining, in response to the write request range being in the range of data bytes of the source being copied, if the range of data bytes of the source has been written to a snapshot (see disclosure that the segments yet to be copied will remain marked, paragraph [0247]);

e) writing, in response to the range of data bytes of the source having been written to the snapshot, the write request to the source (see disclosure that once the requested segment has been copied, the segment is unmarked and the requested update is made, paragraphs [0247] and [0251]); and

f) copying, in response to the range of data bytes of the source having not been written to the snapshot, the range of data bytes to the snapshot, and then writing the write request to the source (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed

snapshot] for later copying to the destination, paragraphs [0247] and [0248]).

18. Regarding claim 40, **Ofek et al.** teaches a system as claimed, comprising:

a) a destination to store a copy from a source (see disclosure of a target destination, such as a receiving primary storage element or receiving secondary storage element such as a tape, paragraph [0248]);

b) a first process to initiate a copy operation of the source wherein the copy operation includes copying each block of the source to the destination, the copy operation being performed in segments, and each segment having a range of data bytes of the source (see disclosure of the marking of physical backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

c) the system to receive a write request to modify a requested range of data bytes of the source while the copy operation is in progress, wherein the write request to modify the requested range of data bytes is a write request range (see disclosure of the receipt of a request to write [hit] to the source device, paragraph [0247]);

d) the system to determine if the write request range falls within the range of data bytes of the source being copied (see disclosure of the determination that the request was for a physical backup segment that is included in the backup segment set in the abstract block set, paragraph [0247]);

e) in response to determining that the write request range falls within the range of bytes of the source being copied, the system to determine if the range of data bytes of the source have been written to a snapshot (see disclosure that the segments yet to be copied will remain marked, paragraph [0247]);

f) in response to determining that the range of data bytes of the source have been written to the snapshot, the write request to be written to the source (see disclosure that once the requested segment has been copied, the segment is unmarked and the requested update is made, paragraphs [0247] and [0251]); and

g) in response to determining that the range of data bytes of the source have not been written to the snapshot, a second process first to copy the range of data bytes of the source to the snapshot, and then the second process to write the write request to the source (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed

snapshot] for later copying to the destination, paragraphs [0247] and [0248]).

19. Regarding claim 46, **Ofek et al.** teaches a method as claimed, comprising:

a) receiving a write request while a copy operation is in progress wherein the copy operation includes copying each block of the source to the destination, the copy operation being performed in segments, and each segment has a range of data bytes of the source, the write request to modify a requested range of data bytes in a source, wherein the write request to modify the requested range of data bytes is a write request range (see disclosure of the receipt of a request to write [hit] to the source device, paragraph [0247]; see also disclosure of the marking of physical backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

b) determining if the write request range falls within the range of bytes of the source being copied (see disclosure of the determination that the request was for a physical backup segment that is included in the backup segment set in the abstract block set, paragraph [0247]);

c) determining that the range of bytes of the source have not been written to a snapshot (see disclosure that the segments yet to be copied will remain marked, paragraph [0247]);

d) in response to determining that the range of bytes have not been written to the snapshot, copying the range of bytes of the source to the snapshot (see disclosure of the determination that the request was for a physical backup segment that is included in the backup segment set in the abstract block set, paragraph [0247]);

e) updating a snapshot map, wherein the snapshot map indicates which blocks are located in the snapshot (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248], a disclosure that renders the claimed updating of a snapshot map inherent, since without an accurate snapshot map, there would be no way in which the segments stored in the snapshot [cache] could be later copied to the target destination); and

f) modifying the range of bytes of data in the source from the write request (see disclosure that once the requested segment has been copied, the segment is

unmarked and the requested update is made, paragraphs [0247] and [0251]).

20. Regarding claim 50, **Ofek et al.** teaches a method for making a copy of data in a database as claimed, comprising:

a) starting a copying operation of a source to a destination, wherein the copy operation is performed in segments and each segment is a range of data bytes of the source, the copy operation started at a begin time (see disclosure of the marking of physical backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

b) maintaining a snapshot volume that includes each block of the source that has a write request directed to that block during the course of the copy operation (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]);

c) receiving a write request directed to the range of data bytes being currently copied to the destination (see disclosure of the receipt of a request to write [hit] to the source device, paragraph [0247]; see also disclosure of the marking of physical backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

d) in response to determining that the range of bytes have not been copied to the snapshot volume, holding the write request until the range of bytes are copied to the snapshot volume (see disclosure that the segments yet to be copied will remain marked, paragraph [0247]; see also disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]);

e) after completion of writing the range of bytes to the snapshot volume, executing the write request on the source to update the source with a changed data (see disclosure that once the requested segment has been copied, the segment is unmarked and the requested update is made, paragraphs [0247] and [0251]); and

f) copying the snapshot volume to the destination in order to maintain a copy of a data on the destination as the data existed on the source at the begin time (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]; see also disclosure that the disclosed system allows backups of a logical object at a specified point in time, paragraph [0239]).

21. Regarding claim 51, **Ofek et al.** teaches a system to make a copy of data in a database as claimed, comprising:

a) a process executing on a processor of the system to initiate a copy operation of a source to a destination, wherein the copy operation is performed in segments and each segment is a range of data bytes of the source, the copy operation started at a begin time (see disclosure of the marking of physical backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

b) the system to maintain a snapshot volume that includes each block of the source that has a write request directed to that block during the course of the copy operation (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]);

c) the system to receive a write request directed to the range of data bytes being currently copied to the destination (see disclosure of the receipt of a request to write [hit] to the source device, paragraph [0247]; see also disclosure of the marking of physical backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

d) in response to determining that the range of bytes have not been copied to the snapshot volume, the system to hold the write request until the range of bytes are copied to the snapshot volume (see disclosure that the segments yet to be copied will remain marked, paragraph [0247]; see also disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]);

e) after completion of writing the range of bytes to the snapshot volume, the system to execute the write request on the source to update the source with a changed data (see disclosure that once the requested segment has been copied, the segment is unmarked and the requested update is made, paragraphs [0247] and [0251]); and

f) copying the snapshot volume to the destination in order to maintain a copy of a data on the destination as the data existed on the source at the begin time (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]; see also disclosure that the disclosed system allows backups of a logical object at a specified point in time, paragraph [0239]).

22. Regarding claim 52, **Ofek et al.** teaches a computer-readable storage media comprising instructions for execution in a processor for the practice of a method of operating a server as claimed, comprising:

a) starting a copying operation of a source to a destination, wherein the copy operation is performed in segments and each segment is a range of data bytes of the source, the copy operation started at a begin time (see disclosure of the marking of physical backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

b) maintaining a snapshot volume that includes each block of the source that has a write request directed to that block during the course of the copy operation (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]);

c) receiving a write request directed to the range of data bytes being currently copied to the destination (see disclosure of the receipt of a request to write [hit] to the source device, paragraph [0247]; see also disclosure of the marking of physical backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19);

d) in response to determining that the range of bytes have not been copied to the snapshot volume, holding the write request until the range of bytes are

copied to the snapshot volume (see disclosure that the segments yet to be copied will remain marked, paragraph [0247]; see also disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]);

e) after completion of writing the range of bytes to the snapshot volume, executing the write request on the source to update the source with a changed data (see disclosure that once the requested segment has been copied, the segment is unmarked and the requested update is made, paragraphs [0247] and [0251]); and

f) copying the snapshot volume to the destination in order to maintain a copy of a data on the destination as the data existed on the source at the begin time (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]; see also disclosure that the disclosed system allows backups of a logical object at a specified point in time, paragraph [0239]).

23. Regarding claim 26, **Ofek et al.** additionally teaches a storage system wherein the process is executed on a file server (see a general discussion and illustration of the network architecture, drawing Figures 8 and 9, as well as paragraphs [0125] through [0143]).

24. Regarding claim 28, **Ofek et al.** additionally teaches a storage system wherein the process is operable to control multiple storage systems (see drawing Figures 11A and 11B et seq.).

25. Regarding claims 29 and 37, **Ofek et al.** additionally teaches a storage system and method wherein the write request includes SCSI commands (see drawing Figure 29; see also paragraph [0134] et seq.).

26. Regarding claims 34 and 36, **Ofek et al.** additionally teaches a method including executing a copy process and managing multiple storage device controllers (see drawing Figures 11A and 11B et seq.).

The examiner notes that the limitation that these steps are carried out by a replication controller is not patentably limiting, since (1) it only serves to give a label to the process executing the method, and (2) the claim is to a method, which constitutes a number of steps; there is no patentable distinction to be made based upon who (or what process) carries out the execution of the claimed steps.

27. Regarding claim 41, **Ofek et al.** additionally teaches a system wherein the process is executed on a file server (see a general discussion and illustration of the network architecture, drawing Figures 8 and 9, as well as paragraphs [0125] through [0143]) and wherein the process is operable to control multiple storage systems (see drawing Figures 11A and 11B et seq.).

28. Regarding claim 45, **Ofek et al.** additionally teaches a system wherein the process is operable to specify a block size so that the storage system writes fixed-size blocks (see disclosure of the ability to specify the physical backup granularity, paragraphs [0236] and [0237] et seq.).

29. Regarding claim 54, **Ofek et al.** additionally teaches a method further comprising:

a) in response to determining that the write request range falls within the range of data bytes of the source being copied, determining if the write request range is directed to a range of data bytes that have not yet been copied (see disclosure that the segments yet to be copied will remain marked, paragraph [0247]); and

b) in response to determining that the write request range is directed to the range of data bytes that have not yet been copied to the snapshot, copying, the range of bytes not yet copied, to the snapshot (see disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248]).

Claim Rejections - 35 USC § 103

30. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

> invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

31. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

32. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

33. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Ofek et al.** (U.S. Patent Application Publication 2005/0204108) in view of **Smith et al.** (U.S. Patent 5,241,631).

34. Regarding claim 49, **Ofek et al.** teaches a computer-readable storage media comprising instructions for execution in a processor for the practice of a method of operating a server comprising:

a) receiving at a source a write request issued from a file system, the write request specifying a first range of data bytes of the source, the write request being received while the source is being copied to a destination (see disclosure of the receipt of a request to write [hit] to the source device, paragraph [0247]; see also disclosure of the marking of physical backup segments that contain data from the logical object marked for copying, paragraph [0243]; see also drawing Figure 19); and

b) in response to receiving the write request, checking if the first range overlaps with a second range wherein the second range is a range of data bytes of the source being copied to the destination and, if so, copying the second range from the source to the snapshot, updating a snapshot map, and then

allowing the write request to write to the source (see disclosure of the determination that the request was for a physical backup segment that is included in the backup segment set in the abstract block set, that the segments yet to be copied will remain marked, the determination that the request was for a physical backup segment that is included in the backup segment set in the abstract block set, paragraph [0247]; see also disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248], a disclosure that renders the claimed updating of a snapshot map inherent, since without an accurate snapshot map, there would be no way in which the segments stored in the snapshot [cache] could be later copied to the target destination; see also disclosure that once the requested segment has been copied, the segment is unmarked and the requested update is made, paragraphs [0247] and [0251]).

Ofek et al. does not explicitly teach a computer-readable storage media wherein the write request is held in a cache while steps are taken to ensure consistency of the snapshot.

Smith et al., however, teaches the use of a write buffer cache architecture, which allows write requests to be held in a FIFO buffer cache while awaiting execution (see col. 17, lines 11-26 et seq.).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a FIFO buffer cache to hold write request commands until they could be executed, since this allows the microprocessor to continue other operations without the need to wait until the write commands have all been executed (see col. 17, lines 11-26).

35. Claims 24 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ofek et al.** (U.S. Patent Application Publication 2005/0204108) as applied to claims 23, 26, 28, 29, 31, 34, 36, 37, 39-41, 45, 46, 50-52 and 54 above.

36. Regarding claims 24 and 32, **Ofek et al.** teaches a storage system and method substantially as claimed.

Ofek et al. does not explicitly teach a storage system and method wherein the source is a RAID system.

However, **Ofek et al.** does disclose the use of RAID systems in the prior art (see drawing Figures 3A and 3B, as well as paragraphs [0029] through [0035]).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize a RAID system, since this would provide redundancy to provide security against the loss of data (see paragraph [0030] et seq.)

37. Claims 25, 33, 47 and 48 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ofek et al.** (U.S. Patent Application Publication 2005/0204108) as applied to claims 23, 26, 28, 29, 31, 34, 36, 37, 39-41, 45, 46, 50-52 and 54 above, and further in view of **Smith et al.** (U.S. Patent 5,241,631).

38. Regarding claims 25 and 33, **Ofek et al.** teaches a storage system and method substantially as claimed, including wherein the system is operable, in response to determining the write request falls within the range of bytes being copied, delaying the write request and updating the snapshot map (see disclosure of the determination that the request was for a physical backup segment that is included in the backup segment set in the abstract block set, paragraph [0247]; see also disclosure that before a requested write can take place, the requested segment is copied out of turn, either directly to the destination, or to a cache [analogous to the claimed snapshot] for later copying to the destination, paragraphs [0247] and [0248], a disclosure that renders the claimed updating of a snapshot map inherent, since without an accurate snapshot map, there would be no way in which the segments stored in the snapshot [cache] could be later copied to the target destination).

Ofek et al. does not explicitly teach a storage system and method wherein the write request is held in a cache while steps are taken to ensure consistency of the snapshot.

Smith et al., however, teaches the use of a write buffer cache architecture, which allows write requests to be held in a FIFO buffer cache while awaiting execution (see col. 17, lines 11-26 et seq.).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a FIFO buffer cache to hold write request commands until they could be executed, since this allows the microprocessor to continue other operations without the need to wait until the write commands have all been executed (see col. 17, lines 11-26).

39. Regarding claims 47 and 48, **Ofek et al.** teaches a system substantially as claimed.

Ofek et al. does not explicitly teach a system wherein the write request is places in a first in first out queue in response to determining that the range of data bytes have not been written to the snapshot.

Smith et al., however, teaches the use of a write buffer cache architecture, which allows write requests to be held in a FIFO buffer cache while awaiting execution (see col. 17, lines 11-26 et seq.).

It would have been obvious to one of ordinary skill in the art at the time of the invention to use a FIFO buffer cache to hold write request commands until they could be executed, since this allows the microprocessor to continue other operations without the need to wait until the write commands have all been executed (see col. 17, lines 11-26).

40. Claims 27 and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ofek et al.** (U.S. Patent Application Publication 2005/0204108) as applied to claims 23, 26, 28, 29, 31, 34, 36, 37, 39-41, 45, 46, 50-52 and 54 above, and further in view of **Tawil** (U.S. Patent 6,421,723).

41. Regarding claims 27 and 35, **Ofek et al.** teaches a storage system and method substantially as claimed.

Ofek et al. does not explicitly teach a storage system and method wherein the file server is connected to a storage area network switch and the file server communicates with the storage device controller through the storage area network switch.

Tawil, however, teaches the use of a storage area network (see col. 1, lines 30-42).

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate a storage area network, since they offer centralized storage of data for increased efficiency and data handling, and provide data access reliability and availability, unobtrusive capacity expansion, improved data backup and recovery, and performance that is competitive with local data storage (see col. 1, lines 30-36).

42. Claims 30 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ofek et al.** (U.S. Patent Application Publication 2005/0204108) as applied to claims 23, 26, 28, 29, 31, 34, 36, 37, 39-41, 45, 46, 50-52 and 54 above, and further in view of **Dulai et al.** (U.S. Patent 6,205,479).

43. Regarding claims 30 and 38, **Ofek et al.** teaches a storage system and method substantially as claimed.

Ofek et al. does not explicitly teach a storage system and method wherein the controller is operable to send the one or more storage device commands by using one of an in-band protocol or an out-of-band protocol.

Dulai et al., however, teaches a storage system and method wherein the controller is operable to send the one or more storage device commands by using one of an in-band protocol or an out-of-band protocol (see disclosure of the use of an in-band protocol, claims 18 and 21).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize an in-band protocol, since this allows the transmission of commands over a widely dispersed network where the use of an out-of-band protocol might be impractical.

44. Claims 42-44 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Ofek et al.** (U.S. Patent Application Publication 2005/0204108) as applied to claims 23, 26, 28, 29, 31, 34, 36, 37, 39-41, 45, 46, 50-52 and 54 above, and further in view of **Simpson et al.** (U.S. Patent 6,128,306).

45. Regarding claims 42-44, **Ofek et al.** teaches a storage system and method substantially as claimed.

Ofek et al. does not explicitly teach a storage system and method comprising a list of blocks to be copied which is reordered to optimize copy speed, wherein control data is inserted before and after the source data block, nor wherein the list is buffered.

Simpson et al., however, teaches a storage system and method comprising a list of blocks to be copied which is reordered to optimize copy speed (see col. 2, lines 15-18), wherein control data is inserted before and after the source data block (see col. 2, lines 5-9), and wherein the list is buffered (see col. 1, lines 55-58).

It would have been obvious to one of ordinary skill in the art at the time of the invention to include prioritized buffering of output data, since this allows more flexible handling of outgoing data traffic, and furthermore since input/output buffering and prioritization and reordering of data in queues was well known in the art at the time of the invention.

46. Claim 53 is rejected under 35 U.S.C. 103(a) as being unpatentable over **Ofek et al.** (U.S. Patent Application Publication 2005/0204108) as applied to claims 23, 26, 28, 29, 31, 34, 36, 37, 39-41, 45, 46, 50-52 and 54 above, and further in view of **Osterman** (U.S. Patent 5,867,650).

47. Regarding claim 53, **Ofek et al.** teaches a storage system substantially as claimed.

Ofek et al. does not explicitly teach a storage system wherein the storage system is operable to send one or more commands by using an out-of-band protocol.

Osterman, however, teaches a storage system wherein the storage system is operable to send one or more commands by using an out-of-band protocol (see col. 2, lines 6-19 et seq.).

It would have been obvious to one of ordinary skill in the art at the time of the invention to utilize out-of-band protocol, since it allows more rapid transmission of large amounts of data (see col. 7, lines 38-45 et seq.).

Conclusion

48. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luke S. Wassum whose telephone number is 571-272-4119. The examiner can normally be reached on Monday-Friday 8:30-5:30, alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, John R. Cottingham can be reached on 571-272-7079. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

In addition, INFORMAL or DRAFT communications may be faxed directly to the examiner at 571-273-4119, or sent via email at luke.wassum@uspto.gov, **with a previous written authorization in accordance with the provisions of MPEP § 502.03.** Such communications must be clearly marked as INFORMAL, DRAFT or UNOFFICIAL.

Customer Service for Tech Center 2100 can be reached during regular business hours at (571) 272-2100, or fax (571) 273-2100.

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